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possible that less attention would have been paid to their labors. In our day, communication has become more ready. Many young Americans study in Europe. Others come to travel after publishing memoirs. Their scientific zeal is thus increased, and the European *savants* become better acquainted with them. Finally, the Anglo-American language is destined, by the force of circumstances, to predominate. In every way, therefore, one may expect a larger development of the sciences in the United States—it is true in a somewhat distant future, for favorable influences make themselves felt only after one or two generations.

BOTANICAL OBSERVATIONS IN WESTERN WYOMING.

BY DR. C. C. PARRY.

No. 2.

Wind River, which in pursuing a general southeast course drains the entire eastern slope of the Wind River range, also receives from the east and north the drainage of an extensive mountain district, to which, as a whole, no distinctive name has yet been applied. To the most southeastern extension of this mountain system the name of Owl Creek range has been locally applied. At the lowest point, where this merges into the open and elevated plains, the main stream, turning sharply to the north, loses the name of Wind River to assume that of the Big Horn, tributary to the Lower Yellowstone. Thus it happens that the same stream, under another name, in doubling on its upper course from southeast to north, receives lower down the eastern drainage of the Owl Creek range, and the broken mountain district to the northwest, through the little known Big Horn tributaries of Owl Creek, Gray Bull and Stinking Water.

Our route, instead of following down the main valley, crossed Wind River some distance above the sharp bend above referred to, thence crossing a low spur of the Owl Creek range, and skirting near the base of the high mountains to the west, passed Owl Creek, Gray Bull and several southern tributaries of Stinking Water, to ascend a main branch of the latter stream to its source in the high divide separating its waters from those of the Yellowstone basin. On this route the chief point of botanical interest centred in the comparatively little explored district of Owl Creek range, the valleys of Owl Creek, Gray Bull and Stinking Water, and the high mountain region at the sources of the last-named stream. We accordingly note briefly in their order of passing the features of botanical interest presented on our route.

The valley of Wind River, as its name suggestively implies, is especially subject to the sweep of fierce northwest winds, which necessarily leave their impress upon the native vegetation. Thus everywhere on the uplands and low open valleys there is a close uniform growth of stunted grasses, or the dull moorish aspect presented by the constantly recurring Artemisia. On saline flats the view is hardly improved by a ranker and more verdant growth of the spine-clad *Sarcobatus;* everywhere there is a monotonous recurrence of the same forms of vegetation, comprising such only as are capable of withstanding the combined unfavorable influences of a parched soil during the season of summer growth, followed by an early and rigorous winter. Only in moist, sheltered bottom-lands do we meet with anything like a rank vegetation, made up of dense willow thickets, occasional copses of *Shepherdia argentea* Nutt., with irregular scattering groves of *Populus balsamea.* Especially abundant in all damp, rich, alluvial tracts in this region we meet with the "wild licorice" (*Glycyrrhiza lepidota* Nutt.), here very commonly infested with a parasitic fungus, *Trichobasis leguminosarum* Link.

In the series of steep bluffs bounding the main river bottoms, the deep gullied ravines offer a greater variety of soil and exposure favorable to a diversified and peculiar vegetation. Here, accordingly, among other rarities we meet with a well marked new species of Astragalus, distinguished by its loose straggling habit, growing in light loamy soil, and sending up a loose spike of white flowers which rarely mature fruit. Prof. Gray has characterized this species (No. 65 of the distributed collection) as *A. ventorum*, n. sp. (see appendix). Here also along the slopes of high gypseous ridges we meet quite abundantly with a new composite, *Schkuhria* (*Platyschkuhria*) *integrifolia* Gray, n. sp. (see appendix, No. 150); of a habit and foliage quite unlike any other species of this genus.

On reaching the broken foot-hills of the Owl Creek range, both the scenery and vegetation became much more diversified; and rounded slopes of disintegrated metamorphic rocks, sharp crests of upheaved strata, and extensive exposures of the brick-red Triassic formation, present in their varied exposures all the conditions for a varied flora. We accordingly here meet with such choice plants as *Stanleya viridiflora* Nutt., *Oxytropis campestris* L., var.? (No. 88), *Aplopappus multicaulis* Nutt., *Tanacetum capitatum* Nutt.

Farther up on the mountain slopes the increased elevation is evidenced by greater freshness of vegetation, the dull brown of the lowlands giving place to a rich soft verdure. Constant running streams, however, are still rare, as the altitude is not sufficient to afford heavy deposits of winter snow to keep up a supply of water through the dry summer months. As we again encounter pine woods composed mainly of *Abies Douglasii* and *Pinus flexilis*, the associated undergrowth is again brought to view in thick, matted growths of *Arctostaphylos uva-ursi*, and occasional patches of *Berberis Aquifolium*. Still there is a characteristic absence of many forms such as one would naturally look for in such localities, neither scrub oak, Rubus nor Symphoricarpus being here represented. Very common and attractive over all this district are the bright, showy flowers of a species of Lupinus (No. 54) allied to *L. sericeus* Ph.? but difficult to refer to any described species; here also *Hedysarum boreale* Nutt. is conspicuous, with its slender spikes of nodding pink flowers, occasionally inclining to a dull pinkish-white. On the crests of the dividing ridge attaining an elevation of nine thousand feet there are extensive exposures of an arenaceous limestone, presenting tabled summits and perpendicular mural faces, with irregular broken talus at their bases. These localities offer not only very attractive points of view of the adjoining country, but afford a rare field for the botanist. Here in rock crevices was found the charming dwarf columbine, which, in compliment to the enterprising commander of the expedition, and its first actual discoverer, I have named *Aquilegia Jonesii*, n. sp. (see appendix, No. 3). This species, which is most nearly allied to *A. vulgaris* L., is sufficiently distinguished by its dwarf size and close cæspitose habit, as well as other well marked characters indicated in the description referred to. It would no doubt prove highly ornamental in cultivation, but unfortunately at the period of our collection (in July) the fruit was just maturing, and it was only by diligent search that sufficient late flowering specimens were met with to complete the description.

Besides this choice addition to our native flora, other plants worthy of note may be enumerated, viz: *Anemone multifida* DC., *Arenaria arctica* Stev., *Arenaria Rossii* R. Br., *Lupinus minimus* Dougl., *Oxytropis campestris* L., *Spiræa cæspitosa* Nutt., *Saxifraga Jamesii* Torr., *Saxifraga debilis* Engel., *Phlox Douglasii* Hook., *Polemonium confertum* Gray, *Androsace chamæjasme* L., *Castilleia pallida* Kth., *Lloydia serotina* Reich.

The peculiarities of the timber growth in this section will be more fully dwelt on in a subsequent article; it is sufficient here to note the regular order of succession everywhere noticeable as distinct zones of arborescent growth. Thus the lower mountain slopes are occupied by scattered groves of *Pinus ponderosa* and *Abies Douglasii*, succeeded higher up by *Pinus flexilis* and *Pinus contorta*, while the highest ridges support a dense forest of *Abies Engelmanni*.

In descending the northeastern slope of the Owl Creek range, forming the western edge of the Big Horn basin, we come upon principal tributary streams draining the high mountain region to the west. In all these valleys, including Owl Creek, Gray Bull and Stinking Water, a uniform character of vegetation is observable, constituting a very distinct botanical district. On the steep gravelly ridges bounding the valley of Owl Creek was first noticed a very remarkable species of *Stanleya*, distinguished from all other known species of this interesting genus by the dense tomentose covering of its stem and foliage, and the sharply hastate form of its leaves. I have accordingly named it *Stanleya tomentosa*, n. sp. (see appendix, No. 13). This plant, then (July 20), in the full glory of its dense spike of cream-colored flowers, formed a conspicuous feature in the floral landscape. In this same locality was also found a new species of *Phelipæa*, which on account of its bright yellow color I have named *Phelipæa lutea*, n. sp. (see appendix, No. 202). This plant, which is met with growing in close proximity to the allied species, *Phelipæa fasciculata* Nutt., furnished an opportunity for a direct comparison of fresh living specimens, thus affording a more satisfactory means of distinguishing specific difference than could be derived from the dry faded plants. Along the borders of a dry ravine was collected a yellow flowered *Astragalus* with nearly mature fruit. This, on a cursory view, I noted as a form of *A. flavus* Nutt., previously collected on Green River. Prof. Gray, to whom specimens were sent under the above name, recognized its distinct character. I have therefore ventured to compliment the *actual* discoverer, as well as the chief elucidator of this difficult genus of western North American plants, by naming it *Astragalus Grayi*, n. sp. (see appendix). A side trip by a detached topographical party to the rugged peak named by Capt. Jones "Washakee's Needles" revealed, in a few fragments brought back by the party, a more distinct alpine flora than any yet seen, including *Douglasia montana* Gray, and a most singular depressed *Townsendia*, with its large single heads immersed in a globular mass of lanulose coated leaves. This, as far as the imperfect material affords the means of judging, is probably an undescribed species, to which the name of *Townsendia condensata*, n. sp., may be provisionally applied. In the lower mountain ranges there is a succession of charming subalpine meadows, set off with limpid lakes and traversed by clear ice-cold brooks, which, among other well known plants, furnished the following additions to our list, viz: *Astragalus oroboides* Hornem., *Œnothera breviflora* Torr. and Gray, *Aplopappus inuloides* Torr. and Gray, *Artemisia incompta* Nutt., and the singularly neat European species *Myosotis alpestris* L. In the valley of Stinking Water (a most inappropriate name for a clear mountain stream abounding in the finest trout), at a single locality, was collected the rare Chenopodiaceous plant characterized by Dr. Torrey as *Endolepis Suckleyi* Torr. This, in the unpublished revision of this family by Mr. S. Watson, is to be included in the genus *Atriplex* (*A. Endolepis* Watson, ined.). The excellent figure of this plant in Vol. xii, pl. 3, of "Pacific Railroad Reports," only fails to represent the straggling habit, densely divaricate branches and the blistered, mealy-dusted leaves of this species. It seems to affect a peculiar soil, so strongly impregnated with saline ingredients as to be entirely bare of all other vegetation.

In our course up the valley of Stinking Water there was little of botanical interest to attract the attention. The prevalent rocks were composed of a coarse igneous conglomerate, which weathered into the most fantastic shapes, presenting on either hand sharp pinnacles, toppling columns and chimney peaks; but the uniformity of soil derived from its disintegration was unfavorable to a rich development of floral forms. We accordingly note briefly the following as most abundant and characteristic: *Arenaria pungens* Nutt., var. *Astragalus microcystis* Gray, *Heuchera cylindrica* Dougl., *Bahia leucophylla* DC., *Stephanomeria paniculata* Nutt.

On reaching the upper portion of this valley, becoming more densely wooded, and frequently spreading out into open, grassy parks, a much more attractive and varied flora is brought to view. The pine woods, composed almost exclusively of *Pinus contorta*, with scattering trees of *Abies grandis*, and in the drier mountain slopes of *Abies Douglasii*, overshadow thick moss-bedded festoons of *Linnœa borealis*, associated with *Pyrola minor* L., and occasionally the more peculiar western form of *Pyrola dentata* Hook. Here too occurs abundantly *Antennaria racemosa* Hook., with sterile and fertile plants growing in distinct plots; scanty specimens were also collected of what is probably the little known *Antennaria luzuloides* Torr. and Gray. Everywhere on the moist, wooded slopes is a thick undergrowth of *Vaccinium myrtilloides* Mx. Rhamnus is represented by the well known northern form of *Rhamnus alnifolius* L. Her., and on the margins of ice-cold springs we meet with *Mimulus moschatus* Dougl. In ascending the higher mountain peaks, the rocky crags are brilliantly adorned with clumps of *Pentstemon deustus* Dougl., or the more showy *Pentstemon Menziesii* Hook. Along the borders of alpine brooks, together with the wide-spread *Mertensia Sibirica* Dougl., we meet with the showy *Mimulus Lewisii* Ph., so interesting in its association with the early explorer Lewis. *Mitella trifida* Gray is here found associated with the more common *Mitella pentandra* Hook. In similar localities, strangely remote from their original habitat, we meet with *Zauschneria Californica* Presl and *Kellogia galioides* Torr.! Near the bald alpine summits, where the ground is saturated from the recent melting of snow-drifts, grows the "California heath," *Bryanthus empetriformis* Gray, and here also at the most eastern locality yet noted was found a dwarf form of *Spraguea umbellata* Torr. The occurrence of so many peculiar Californian forms in such an isolated locality on the Atlantic slope is very suggestive.

On the high alpine crest at the head of Stinking Water, overlooking to the west the Yellowstone basin and its magnificent lake, a more alpine flora is exhibited, though composed mainly of dwarfed forms of plants met with lower down, as may be seen from the following list, noted down August 2, viz: *Arabis Drum-*

mondii Gray, *Arabis canescens* Nutt., *Draba alpina* L., *Smelowskia calycina* C. A. Mey., *Arenaria arctica* Stev., *Ivesia Gordoni* Torr. and Gray, *Potentilla dissecta* Pursh, *Astragalus alpinus* L., *Astragalus Kentrophyta* Gray, *Lupinus minimus* Dougl., *Sedum stenopetalum* Ph., *Townsendia* (not determined as to species. No. 145), *Erigeron compositum* Ph., *Senecio canus* Hook., *Achillea millefolium* L., *Phlox Douglasii* Hook., *Polemonium humile* var. (*P. parvifolium* Nutt.), *Mertensia alpina* Dougl., *Myosotis alpestris* L., *Eriogonum ovalifolium* Nutt.

In a concluding article, the general botanical features of Yellowstone Park and the head waters of Snake and Wind Rivers will be considered.

NOTE.—In order to render the determination of the new species mentioned in this and the preceding paper as complete as possible, and most convenient for reference, the descriptions will be given as an appendix to the concluding article.

NOTES UPON AMERICAN WATER BIRDS.

BY ROBERT RIDGWAY.

THE following are a few points which have been developed by our studies of the water birds in connection with the forthcoming "History of North American Birds," by Professor Baird, Dr. Brewer and the writer. They are published in advance of our work, that ornithologists may thus the sooner have the benefit of them.

In making a comparative study of the North American and European Grallæ, I have been struck by a very curious parallelism between certain congeneric or conspecific forms of the two continents. In many cases, the European analogues differ from their North American representatives chiefly, if not exclusively, in having the rump immaculate white, instead of spotted. The following table will show the extent of this parallelism, so far as I have had occasion to trace it.

American forms (*rump spotted*).	*European forms* (*rump immaculate*).
Rhyacophilus solitarius.	R. ochropus.
Gambetta flavipes.	G. stagnatilis.
Numenius Hudsonicus.	N. phæopus.
Hæmatopus palliatus.	H. ostralegus.